

**FACT SHEET FOR NPDES PERMIT  
NO. WA-002100-8**

**CITY OF BREWSTER  
WASTEWATER TREATMENT FACILITY**

**SUMMARY**

The City of Brewster is seeking re-issuance of its National Pollutant Discharge Elimination System (NPDES) Permit for its Publicly-Owned Treatment Works (POTW). The POTW consists of approximately 6.8 miles of sewers, 2 lift stations, and a wastewater treatment plant.

The treatment plant provides secondary-level treatment utilizing an activated sludge process and chlorine disinfection, and then discharges treated wastewater through a submerged outfall to the Columbia River. The City recently completed an upgrade to its POTW, which has provided improved wastewater treatment capabilities. Further upgrades are planned within the next five years.

In addition to the effluent limits in the permit's S.1, the monitoring requirements in S.2, and the reporting requirements in S.3, the proposed permit requires the submittal of: 1) an Infiltration and Inflow Evaluation, 2) an Outfall Evaluation and, 3) Additional Analysis of Influent and Effluent.

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## **INTRODUCTION**

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the State is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix E--Response to Comments.

GENERAL INFORMATION	
Applicant	City of Brewster
Facility Name and Address	City of Brewster Wastewater Treatment Facility 603 South 5 <sup>th</sup> Street Brewster, WA 98812
Type of Treatment:	Oxidation Ditch Activated Sludge System
Discharge Location	Columbia River, River Mile 529.8 Latitude: 48° 05' 15" N Longitude: 119° 47' 01" W
Water Body ID Number	NN57SG

## BACKGROUND INFORMATION

### DESCRIPTION OF THE FACILITY

#### History

The City of Brewster (City) is located in the north-central portion of the State on the south margin of Okanogan County along State Route 97, approximately two miles downstream of the confluence of the Okanogan River with the Columbia River.

The Publicly Owned Treatment Works (POTW) was originally constructed and placed into operation in 1965 as an Imhoff tank sewage treatment plant. The present oxidation ditch treatment facility was built in 1967 at the south end of Brewster, at the banks of Lake Pateros in response to rising water caused by the Wells Dam Hydroelectric Project. The facility received a major upgrade in 1981-82 to add influent screening, oxidation ditch modifications, the addition of secondary clarification, and a larger chlorine contact chamber.

In May 2002, the Department approved a Wastewater Treatment Facility Plan Addendum for Brewster. The Plan identified the following necessary improvements to the collection and wastewater treatment system: 1) headworks and influent screening improvements, 2) new aerators and overflow weir for the oxidation ditch, 3) a new secondary clarifier to meet the State's reliability criteria along with a retrofit of the existing secondary clarifier, 4) biosolids management improvements, 5) replacement of the existing plant electrical motor control center, 6) a standby generator to meet essential plant processes during power outages, 7) disinfection system improvements including a new effluent flow meter and, 8) collection system improvements including an upgraded lift station.

In 2003, a major upgrade was completed that added the following components to the treatment system: 1) a new headworks to provide improved influent screening, 2) a Parshall flume at the headworks to provide more reliable influent flow measurement, 3) modifications to the oxidation ditch which included new rotors to meet current and future organic loads, 4) a new secondary clarifier, 5) improved instrumentation and computerized control and, 6) an emergency generator to provide energy for critical components during power outages.

The planned Phase One retro-fit of the original secondary clarifier was not accomplished during the 2003 construction season. However, the original clarifier is operable and available for use and therefore fulfills the redundancy required for this type of treatment.

The City is planning to implement additional upgrades identified by the Facility Plan and not addressed in the 2003 construction in the future. The construction of the Phase 2 upgrades should take place during the 5-year cycle of the proposed permit.

### **Collection System Status**

The collection system has been in use since 1953. It consists of approximately 6.8 miles of piping, approximately 140 manholes, and two lift stations (north and south). The south lift station near the POTW is nearing the end of its design life and is due to be upgraded during the next phase of treatment works improvements.

Based on both POTW and lift station flows, there is some inflow and infiltration (I&I) into the collection system. Peak rainfall events appear to generate as much as a 25% increase in wastewater flow to the treatment plant. However, the I&I has not exceeded system capacity, even during peak rainfall events. The City has established a program of identification and removal of both inflow and infiltration sources. The proposed permit (S4.E) requires an Infiltration and Inflow Evaluation to be conducted by August 1, 2005.

### **Treatment Processes**

The POTW is an activated sludge complete-mix oxidation ditch design, which provides secondary treatment for the City's wastewater. The wastewater is disinfected by chlorination prior to discharge through the outfall.

### **Discharge Outfall**

Secondary treated and disinfected effluent is discharged from the facility via an outfall line, which extends into the Columbia River at river mile 529.8. The outfall is an open ended pipe, which lies approximately 42 feet below the surface and 475 feet offshore.

## **Residual Solids**

Grit, rags, scum, and other screenings from the headworks are drained and disposed of as solid waste at the local landfill.

In 2002, a used SOMAT biosolids press was acquired and put into service to dewater waste activated sludge. This mechanism has not worked as well as desired in that it requires the extensive use of polymers to settle the sludge prior to dewatering. The rate of polymer use is a considerable cost to the City. There is also a significant labor expense involved with the present biosolids handling process. The City is planning improvements to the biosolids handling processes, consistent with the 2002 Facility Plan, which include converting an existing, abandoned clarifier for use as an aerobic sludge digester.

The City of Brewster has applied for, and is provisionally covered under the State's proposed Biosolids General Permit.

## **PERMIT STATUS**

The existing permit for this facility was issued on January 8, 1999. The permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, and Total Residual Chlorine.

An application for permit renewal was submitted to the Department on October 29, 2003 and accepted by the Department on November 6, 2003.

## **SUMMARY OF COMPLIANCE WITH THE EXISTING PERMIT**

The facility received its last inspection on March 11, 2004.

Since the existing permit was issued, the Permittee has remained in compliance, with a few exceptions, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department.

A Notice of Violation (NOV) No. DE 04WQCR-1045 was issued by the Department on March 18, 2004, in response to an exceedance of the Permit's average weekly fecal coliform limit during January 2004. The same NOV also cited the failure to conduct the required frequency of monitoring during January 2004.

The Department also issued Administrative Order No. DE 00WQCR-1898 which extended the existing permit's interim chlorine limits through June 30, 2004. The interim limits are 0.7 mg/L monthly average and an average weekly limit of 1.0 mg/L. As of the date this fact sheet was written (July 2004), this Administrative Order had expired, therefore the final chlorine limits given in the existing permit are in effect (0.5 mg/L monthly average and an average weekly limit of 0.75 mg/L).

## WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in DMRs.

### Influent Conventional Pollutant Loadings

Monthly influent characterization data are presented in Table 1 in comparison to design loadings. Data reflect influent loadings reported in DMRs submitted during the January 2001 through March 2004 time period.

**Table 1: Influent Characteristics**

Parameter	Average January 2001 through March 2004	Highest Monthly Loading	Percent of Monthly Design Loading	Average Monthly Design Loading <sup>a</sup>
Flow, in MGD	0.316	0.396	76	0.418
BOD <sub>5</sub> lbs/day	575	866	81	710
TSS lbs/day	457	718	66	694
<sup>a</sup> Average month design loading for the upgraded treatment plant.				

### Influent Priority Pollutants

From 2000 through 2003, the City sampled the following influent priority pollutants annually: chloroform, organochlorine pesticides, and zinc. Data were taken from the required annual Additional Chemical Analysis of Influent and Effluent Report (S9.) and are summarized in Table 2.

**Table 2: Influent Priority Pollutant Characterization**

Influent Characterization				
Priority Pollutant Parameter	Units	Maximum Value	Number of Samples	Number of Detects
Zinc	µg/L	374	4	4
Chloroform	µg/L	55	4	3
Organochlorine Pesticides	µg/L	ND <sup>a</sup>	4	ZERO
<sup>a</sup> ND = non detect				

## Effluent Characterization

The treatment plant has very recently received a significant upgrade, which was completed in November 2003. The limited data set of effluent characterizations since the upgrade precludes a meaningful discussion of the new plant's performance. Therefore, the effluent will not be characterized in this fact sheet.

## Effluent Priority Pollutants

Results from a limited set of priority pollutant scans are presented below. The annual sampling is required by the existing permit's S9. Additional Chemical Analysis of Influent and Effluent. The sampling results are from January 2001 to February 2004.

**Table 3: Effluent Priority Pollutant Characterization**

Effluent Priority Pollutant Characterization				
Priority Pollutant Parameter	Units	Maximum Value	Number of Samples	Number of Detects
Zinc	µg/L	103	4	4
Chloroform	µg/L	10.7	4	3
Dichlorobromomethane	µg/L	1.2	3	1
Organochlorine Pesticides	µg/L	ND <sup>a</sup>	4	ZERO
<sup>a</sup> ND = non detect				

During the existing permit cycle, from January 1999 to the present, the treatment plant has demonstrated very little measurable toxicity in its whole effluent toxicity (WET) characterizations at concentrations approaching the acute critical effluent concentration (ACEC). The ACEC for this discharge is 1%. The 2002 did show toxicity, but that was the result of an improperly obtained sample. This faulty wastewater sample was obtained from chlorinated wastewater. More information about the WET testing characterization is presented in Table 11.

## SEPA COMPLIANCE

A determination on non-significance was issued by the City of Brewster in July 2001 for the upgrade to the sewage treatment plant.

### **PROPOSED PERMIT LIMITATIONS**

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this proposed permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

## DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from City of Brewster 2002 Phase 1 WWTP Upgrades engineering report prepared by J-U-B Engineers, Inc. and are presented in Table 4:

**Table 4: Year 2020 Design Standards for City of Brewster WWTP**

Parameter	Design Quantity
Average day flow	0.418 MGD
Maximum day flow	0.836 MGD
Instantaneous peak flow	1.570 MGD
BOD <sub>5</sub> influent loading average day	710 lbs/day
BOD <sub>5</sub> influent loading maximum day	1550 lbs/day
TSS influent loading average day	694 lbs/day
TSS influent loading maximum day	1450 lbs/day
Design population equivalent	1394

## TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by Federal and State regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (Federal) and in Chapter 173-221 WAC (State). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment (AKART) for municipal wastewater.

The following technology-based limits for pH, Fecal Coliform, BOD<sub>5</sub>, and TSS are taken from Chapter 173-221 WAC are presented in Table 5:

**Table 5: Technology-based Limits**

Parameter	Limit
pH	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD <sub>5</sub> (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
Total Residual Chlorine	Average Monthly Limit = 0.5 mg/L Average Weekly Limit = 0.75 mg/L

The technology-based monthly average limitation for chlorine is derived from standard operating practices. The Water Pollution Control Federation's Chlorination of Wastewater (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/liter chlorine residual is maintained after fifteen minutes of contact time. See also Metcalf and Eddy, Wastewater Engineering, Treatment, Disposal and Reuse, Third Edition, 1991. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/liter chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/liter.

The existing permit has interim and final chlorine limits. Due to the delay in construction of the planned upgrade, the final limits were never put into effect. The Department issued Administrative Order No. DE 00WQCR-1898 which extended the interim limits through June 30, 2004. The interim limits are 0.7 mg/L monthly average and an average weekly limit of 1.0 mg/L. The proposed permit will adopt the technology-based limits given in the previous paragraph.

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent mass loadings for BOD and TSS (lbs/day) were calculated as the maximum monthly design flow (0.418 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = 104.6 lbs/day.

The weekly average effluent mass loading is calculated as 1.5 x monthly loading = 156.9 lbs/day.

## **SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS**

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a State regulation designed to protect the beneficial uses of the surface waters of the State. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

### **Numerical Criteria for the Protection of Aquatic Life**

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

### **Numerical Criteria for the Protection of Human Health**

The State was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

### **Narrative Criteria**

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

### **Antidegradation**

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in this permit. The discharges authorized by this permit should not cause a loss of beneficial uses.

### **Critical Conditions**

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

### **Mixing Zones**

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving AKART and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

### **Description of the Receiving Water**

The facility discharges to the Columbia River which is designated as a Class A receiving water in the vicinity of the outfall. Significant nearby non-point sources of pollutants include agriculture.

Characteristic uses include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses. The Columbia River, downstream from the Brewster POTW at the Wells Dam forebay, is on the State's 2002 -2004 list (303d list) for impaired water bodies. The river at this location has elevated water temperature and total dissolved gas (TDG) concentrations. A Total Maximum Daily Load assessment is being conducted for TDG. The POTW is not expected to add to this problem or receive a load allocation since elevated TDG is caused by spilling water over the dam's overflow structures. A TMDL is also being conducted for Temperature on the main stem of the Columbia River. The Environmental Protection Agency (EPA) is the lead agency conducting this assessment. The EPA's draft TMDL identifies the reservoirs behind the dams as the chief cause of the elevated water temperature. Therefore, the Brewster POTW is not expected to contribute significantly to the elevated temperature, and is not expected to receive a temperature load allocation.

### Surface Water Quality Criteria

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are presented in Table 6:

**Table 6: Applicable Water Quality Criteria**

Parameter	Criteria
Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

### Consideration of Surface Water Quality-Based Limits for Numeric Criteria

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. Mixing zones are

authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The dilution factors of effluent to receiving water that occur within these zones for the proposed permit have been determined at the critical condition by the use of the Visual Plumes, UM3 model. The dilution factors in the existing permit are significantly larger than the dilution factors presented below for the proposed permit. The factors in the existing permit were derived utilizing the RIVPLUM5 mixing zone model. The use of this model was inappropriate. The RIVPLUM5 model was intended for use only on shallow rivers in which the effluent plume could be presumed to be mixed instantaneously through the water column's depth. The Columbia River at the location of the Brewster POTW outfall is at least 40 feet deep, and the effluent would not mix instantaneously.

The dilution factors, developed utilizing the Visual Plumes UM3 model, are presented in Table 7 (from Appendix C):

**Table 7: Dilution Factors**

Mixing Zone Type	Acute	Chronic
Aquatic Life	100	1093
Human Health, Carcinogen		1135

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The critical condition for the Columbia River is the seven day average low river flow with a recurrence interval of ten years (7Q10).

The ambient background data used for this proposed permit are presented in Table 8:

**Table 8: Ambient Data Used in Reasonable Potential Analysis**

Parameter	Value used
7Q10 low flow	41,337 cfs
Velocity	0.8 ft/sec
Average Depth	34 feet
Width	1,500 feet
Temperature (90 <sup>th</sup> percentile critical season)	18.4 °C
pH (high)	8.01
Dissolved Oxygen	8.0 mg/L
Total Ammonia-N	0.01 mg/L
Fecal Coliform	5 colonies / 100 mL
Conductivity	126 (umhos/cm)
Alkalinity (90 <sup>th</sup> percentile)	63 mg/L as CaCO <sub>3</sub>
Turbidity	1.1 NTU
Hardness (10 <sup>th</sup> percentile)	63 mg/L as CaCO <sub>3</sub>
Zinc (95 <sup>th</sup> percentile)	5.8 ug/L (filtered sample)

The impacts of dissolved oxygen deficiency, temperature, pH, fecal coliform, chlorine, ammonia, metals, and other toxics were determined as shown below, using the dilution factors described above.

BOD<sub>5</sub>--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature and pH--The impact of pH and temperature were modeled using the calculations from EPA, 1988. The input variables were dilution factor 982, upstream temperature 18°C, upstream pH 8.01, upstream alkalinity 63 (as mg CaCO<sub>3</sub>/L), effluent temperature 22 °C, effluent pH of 7.0 (low), effluent pH of 8.1 (high), and effluent alkalinity 232 (as mg CaCO<sub>3</sub>/L). Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitations for pH were placed in the proposed permit and temperature was not limited.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 982.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in this proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: chlorine, ammonia, chloroform, and zinc. A reasonable potential analysis (see Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

Dichlorobromomethane was also detected in a single sample, but this parameter has only human health criteria, not aquatic life criteria. This parameter exhibited no reasonable potential to exceed human health criteria (see Appendix C).

The determination of the reasonable potential for chloroform, zinc, ammonia, and chlorine to exceed the water quality aquatic life criteria was evaluated with procedures given in EPA, 1991 at the critical condition. The critical condition in this case occurs in the warm season. The parameters used in the critical condition modeling are as follows: acute dilution factor 100, chronic dilution factor 1093, receiving water temperature 18 °C, receiving water alkalinity 63 (as mg CaCO<sub>3</sub>/L), zinc and ammonia.

Valid ambient background data were available for zinc and ammonia. Background data for chloroform and chlorine were not available, but concentrations are reasonably assumed to be zero given the reactive nature of these constituents and the absence of any nearby sources of contamination by these constituents.

Calculations using all applicable data resulted in a determination that there is no reasonable potential for this discharge to cause a violation of water quality standards. This determination assumes that the Permittee meets the other effluent limits of this permit.

### **Whole Effluent Toxicity**

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.

The State's WET regulation 173-205 WAC establishes an effluent limit for acute toxicity if after one year of characterization, the median survival of any species in 100% effluent is below 80% or if any one test of any species exhibits less than 65% survival in 100% effluent. The effluent limit for acute toxicity is no acute toxicity detected [zero mortalities] in a test concentration representing the acute critical effluent concentration (ACEC). The ACEC for Brewster's STP discharge is 1%.

If an effluent limit for acute toxicity is established, a facility must complete biannual testing for the permit term, or a total of ten WET tests. If toxicity occurs at the ACEC in any one of the series of ten WET tests, a series of weekly WET tests for four consecutive weeks must be conducted. If toxicity occurs in violation of the acute toxicity limit during this weekly series of WET test occurs, the Permittee must submit a Toxicity Identification/Reduction Evaluation (TI/RE) plan to the Department for review and approval.

In 1990, the Department conducted a Class II Inspection at Brewster's wastewater treatment facility, in which pesticides were discovered in the effluent. This is considered to be the basis for Brewster's WET test requirement. It was suspected, but never proved, that a car wash in Brewster was allowing agricultural pesticide application equipment to be spray washed at the facility. The car wash was originally issued a State Wastewater Discharge permit in 1984. By December 2000, the car wash had demonstrated to the Department's satisfaction that its effluent no longer had the potential for a significant impact to the wastewater treatment plant. The permit for the car wash was cancelled in February 2001.

Prior to this year (2004), the POTW accepted effluent from two fruit packing warehouses, MAGI and Brewster Heights Packing (BHP). However, in 2004 MAGI decided to move its fruit packing line to its Chelan facility. MAGI provided approximately 42 % of the fruit packing effluent to the Brewster STP. As a result, any potential toxicity from this type of discharge has been significantly reduced.

BHP obtains its process water from the City of Brewster Water Treatment Plant. Based on water consumption records obtained from the City, as well as BHP's NPDES Fruit Packer application, the calculated discharge to the City's STP is approximately 9,700 gallons per day. This volume is only 3% of the total daily influent flow to Brewster's STP. Brewster Heights Packing Fresh Fruit Packing General Permit was re-issued in July 2004. This permit limits potentially harmful discharges to POTWs. BHP's permit allows only chlorine-based fungicides such as sodium hypochlorite to be used in the facility's apple packing lines' discharge to the POTW. The permit places a limit of 0.5 mg/L of total residual chlorine in the discharge to the POTW. The City has reviewed the permit and certified that its wastewater treatment facility has adequate hydraulic and treatment capacity to accept the flows from the packing house.

The table below is a synopsis of WET testing conducted since 1999. October 2002 test results were not included in the table since the effluent sample was obtained in an improper location. These results provide strong evidence that effluent concentrations within the range of 6.5% to 50% present little or no toxicity to these aquatic organisms. Therefore, the ACEC of 1% is very unlikely to result in toxicity to the test organisms.

**Table 9: Whole Effluent Toxicity Testing Results**

DATE	Species	Percent Concentration Effluent	Replicates	Organisms / Replicate	Total # Organisms	% Survival Results
23-Nov-99	Daphnia	6.5%	4	5	20	100
09-Oct-00	Daphnia	6.5%	4	5	20	100
18-Dec-01	Daphnia	6.5%	4	5	20	100
13-Nov-03	Daphnia	6.5%	4	5	20	100
23-Nov-99	Daphnia	12.5%	4	5	20	90
09-Oct-00	Daphnia	12.5%	4	5	20	100
18-Dec-01	Daphnia	12.5%	4	5	20	100
13-Nov-03	Daphnia	12.5%	4	5	20	100
23-Nov-99	Daphnia	25.0%	4	5	20	95
09-Oct-00	Daphnia	25.0%	4	5	20	100
18-Dec-01	Daphnia	25.0%	4	5	20	100
13-Nov-03	Daphnia	25.0%	4	5	20	95
13-Nov-03	Daphnia	50.0%	4	5	20	100
18-Dec-01	Daphnia	50.0%	4	5	20	100
09-Oct-00	Daphnia	50.0%	4	5	20	100
23-Nov-99	Daphnia	50.0%	4	5	20	90
13-Nov-03	Ceriodaphnia	6.5%	4	5	20	100
18-Dec-01	Ceriodaphnia	6.5%	4	5	20	100
09-Oct-00	Ceriodaphnia	6.5%	4	5	20	100
23-Nov-99	Ceriodaphnia	6.5%	4	5	20	100
13-Nov-03	Ceriodaphnia	12.5%	4	5	20	100
18-Dec-01	Ceriodaphnia	12.5%	4	5	20	100
09-Oct-00	Ceriodaphnia	12.5%	4	5	20	100
23-Nov-99	Ceriodaphnia	12.5%	4	5	20	100
13-Nov-03	Ceriodaphnia	25.0%	4	5	20	100
18-Dec-01	Ceriodaphnia	25.0%	4	5	20	100
09-Oct-00	Ceriodaphnia	25.0%	4	5	20	100
23-Nov-99	Ceriodaphnia	25.0%	4	5	20	100
13-Nov-03	Ceriodaphnia	50.0%	4	5	20	100
18-Dec-01	Ceriodaphnia	50.0%	4	5	20	100
09-Oct-00	Ceriodaphnia	50.0%	4	5	20	100
23-Nov-99	Ceriodaphnia	50.0%	4	5	20	100

There are no industrial dischargers to the POTW, other than BHP. Whole effluent toxicity is not expected in treated effluent from typical domestic wastewater, which constitutes the very large percentage of this POTW's influent. Finally, the annual Additional Chemical Analysis of Influent and Effluent revealed no detectable concentrations of pesticides or fungicides associated with the fruit packing industry. Therefore, no whole effluent toxicity testing is required in the proposed permit. The Department may require effluent toxicity testing in the future if it receives information that toxicity may be present in this effluent.

## Human Health

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the State by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The existing permit has a requirement for Additional Chemical Analysis of Influent and Effluent (S9). The Permittee was required to sample effluent samples for priority pollutants given in 40 CRR Part 122, Appendix D, Table II. The only human health pollutants detected in this sampling were chloroform and dichlorobromomethane. Dichlorobromomethane was detected in a single sample at a low concentration (1.2 µg/L). Chloroform had a 95<sup>th</sup> percentile concentration of 19.4 µg/L. Both of these pollutants were determined to not have a harmful concentration for human health at the edge of the applicable chronic mixing zone (see the Appendix C human health spreadsheet for technical calculations).

## Sediment Quality

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

## COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED JANUARY 8, 1999

**Table 10: Ambient Data Used in Reasonable Potential Analysis**

Parameter	Existing Permit Limits		Proposed Permit Limits	
	Monthly Average	Weekly Average	Monthly Average	Weekly Average
BOD	30 mg/L 85 % removal 91 lbs/day	45 mg/L 136 lbs/day	30 mg/L 85 % removal 105 lbs/day	45 mg/L 157 lbs/day
TSS	30 mg/L 85 % removal 91 lbs/day	45 mg/L 136 lbs/day	30 mg/L 85 % removal 105 lbs/day	45 mg/L 157 lbs/day
Fecal Coliform	200/100 mL	400/100 mL	200/100 mL	400/100 mL
pH	6 to 9 standard units		6 to 9 standard units	

Parameter	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
Chlorine	0.7 mg/L	1.0 mg/L	0.5 mg/L	0.75 mg/L

The BOD and TSS loadings in the proposed permits are increased due to larger design influent loadings resulting from with the 2003 upgrade to the treatment plant.

### MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in the proposed permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 2002) for an oxidation ditch with activated sludge wastewater treatment facility.

The permit also requires the submittal of an Additional Chemical Analysis Of Influent And Effluent (S9) in order to determine if toxic chemicals are present in the effluent and also to determine removal efficiencies of toxic pollutants by the treatment system. The list of chemicals to be analyzed includes the volatile compounds, acid compounds, base/neutral compounds, and pesticides given in Appendix D, Table II, of 40 CFR 122. This list of compounds is also presented in Appendix D of this fact sheet. The results of the analysis are to be submitted with the Application for Permit Renewal.

### LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for the following general chemistry parameters: Biochemical Oxygen Demand, Chloride, Total Residual Chlorine, Dissolved Oxygen, pH, and Total Suspended Solids. The laboratory is also accredited for Fecal Coliform testing.

## **OTHER PERMIT CONDITIONS**

### **REPORTING AND RECORDKEEPING**

The provisions of Special Condition S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

### **PREVENTION OF FACILITY OVERLOADING**

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in Special Condition S4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Special Condition S4. restricts the amount of flow.

### **OPERATION AND MAINTENANCE (O&M)**

This permit contains Special Condition S5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment. The Department has approved an updated O&M manual for this facility that incorporates the Phase 1 upgrades at the treatment plant. In the event the planned Phase 2 upgrade occurs during the proposed permit's five year cycle, the permit requires an updated O&M manual be submitted to the Department for review and approval.

### **RESIDUAL SOLIDS HANDLING**

To prevent water quality problems the Permittee is required in Special Condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 173-308 WAC, "Biosolids Management". The disposal of other solid waste is under the jurisdiction of the Okanogan County Health Department.

### **PRETREATMENT**

#### **Federal and State Pretreatment Program Requirements**

Under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10"

(1986), the Department of Ecology (Department) has been delegated authority to administer the Pretreatment Program (i.e. act as the Approval Authority for oversight of delegated Publicly Owned Treatment Works (POTWs)). Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system). The requirements for a Pretreatment Program are contained in Title 40, part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program (40 CFR 403.8(f)(1)(iii)), the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) ( 40 CFR 403.8 (f)(1)(i)).

The Department is responsible for issuing State Waste Discharge Permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge (WAC 173-216-110(5)) (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.). Industrial dischargers need to apply for a State Waste Discharge Permit sixty days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with State water quality standards and biosolids standards.

The Department requires this POTW to fulfill some of the functions required for the Pretreatment Program in the NPDES permit (e.g. tracking the number and general nature of industrial dischargers to the sewage system). The POTW's NPDES permit will require that all SIUs currently discharging to the POTW be identified and notified of the requirement to apply for a wastewater discharge permit from the Department. None of the obligations imposed on the POTW relieve an industrial or commercial discharger of its primary responsibility for obtaining a wastewater discharge permit (if required), including submittal of engineering reports prior to construction or modification of facilities (40 CFR 403.12(j) and WAC 173-216-070 and WAC 173-240-110, et seq.).

### **Wastewater Permit Required**

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

### **Requirements for Routine Identification and Reporting of Industrial Users**

The NPDES permit requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system". Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify industrial dischargers, in writing, of their responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State waste discharge permit application.

### **Duty to Enforce Discharge Prohibitions**

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet..

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

### **Support by the Department for Developing Partial Pretreatment Program by POTW**

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

## **OUTFALL EVALUATION**

Special Condition S8. requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall. This requirement is justified because the Department has no information that the outfall has been examined for structural integrity or sediment build-up since it was constructed in 1967.

## **GENERAL CONDITIONS**

General Conditions are based directly on State and Federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

## **PERMIT ISSUANCE PROCEDURES**

### **PERMIT MODIFICATIONS**

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended State or Federal regulations.

### **RECOMMENDATION FOR PERMIT ISSUANCE**

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for five years.

## **REFERENCES FOR TEXT AND APPENDICES**

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C. Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition. Tsiavoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

Laws and Regulations( <http://www.ecy.wa.gov/laws-rules/index.html> )

Permit and Wastewater Related Information  
(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

## **APPENDIX A -- PUBLIC INVOLVEMENT INFORMATION**

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on July 16, 2003 in the Wenatchee World to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on August 12, 2004 in the Quad City Herald to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator  
Department of Ecology  
Central Regional Office  
15 West Yakima Avenue, Suite 200  
Yakima, WA 98902

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 509/457-7105, or by writing to the address listed above.

This permit and fact sheet was prepared by James Leier.

## APPENDIX B -- GLOSSARY

**Acute Toxicity**--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

**AKART**-- An acronym for “all known, available, and reasonable methods of prevention, control, and treatment”.

**Ambient Water Quality**--The existing environmental condition of the water in a receiving water body.

**Ammonia**--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Average Monthly Discharge Limitation** --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

**Average Weekly Discharge Limitation** -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Best Management Practices (BMPs)**--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>**--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the Federal Clean Water Act.

**Bypass**--The intentional diversion of waste streams from any portion of a treatment facility.

**CBOD5** – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD5 is given in 40 CFR Part 136.

**Chlorine**--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic Toxicity**--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean Water Act (CWA)**--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Combined Sewer Overflow (CSO)**--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

**Compliance Inspection - Without Sampling**--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance Inspection - With Sampling**--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

**Composite Sample**--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

**Construction Activity**--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

**Continuous Monitoring** –Uninterrupted, unless otherwise noted in the permit.

**Critical Condition**--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Dilution Factor**--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

**Engineering Report**--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal Coliform Bacteria**--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

**Grab Sample**--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

**Industrial User**-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

**Industrial Wastewater**--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Infiltration and Inflow (I/I)**--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

**Interference** -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

**Major Facility**--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum Daily Discharge Limitation**--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Method Detection Level (MDL)**--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

**Minor Facility**--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Mixing Zone**--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

**National Pollutant Discharge Elimination System (NPDES)**--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

**Pass through** -- A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

**pH**--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

**Potential Significant Industrial User**--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

**Quantitation Level (QL)**-- A calculated value five times the MDL (method detection level).

**Significant Industrial User (SIU)**--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority\* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority\* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

\*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

**State Waters**--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the State of Washington.

**Stormwater**--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

**Technology-based Effluent Limit**--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Suspended Solids (TSS)**--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

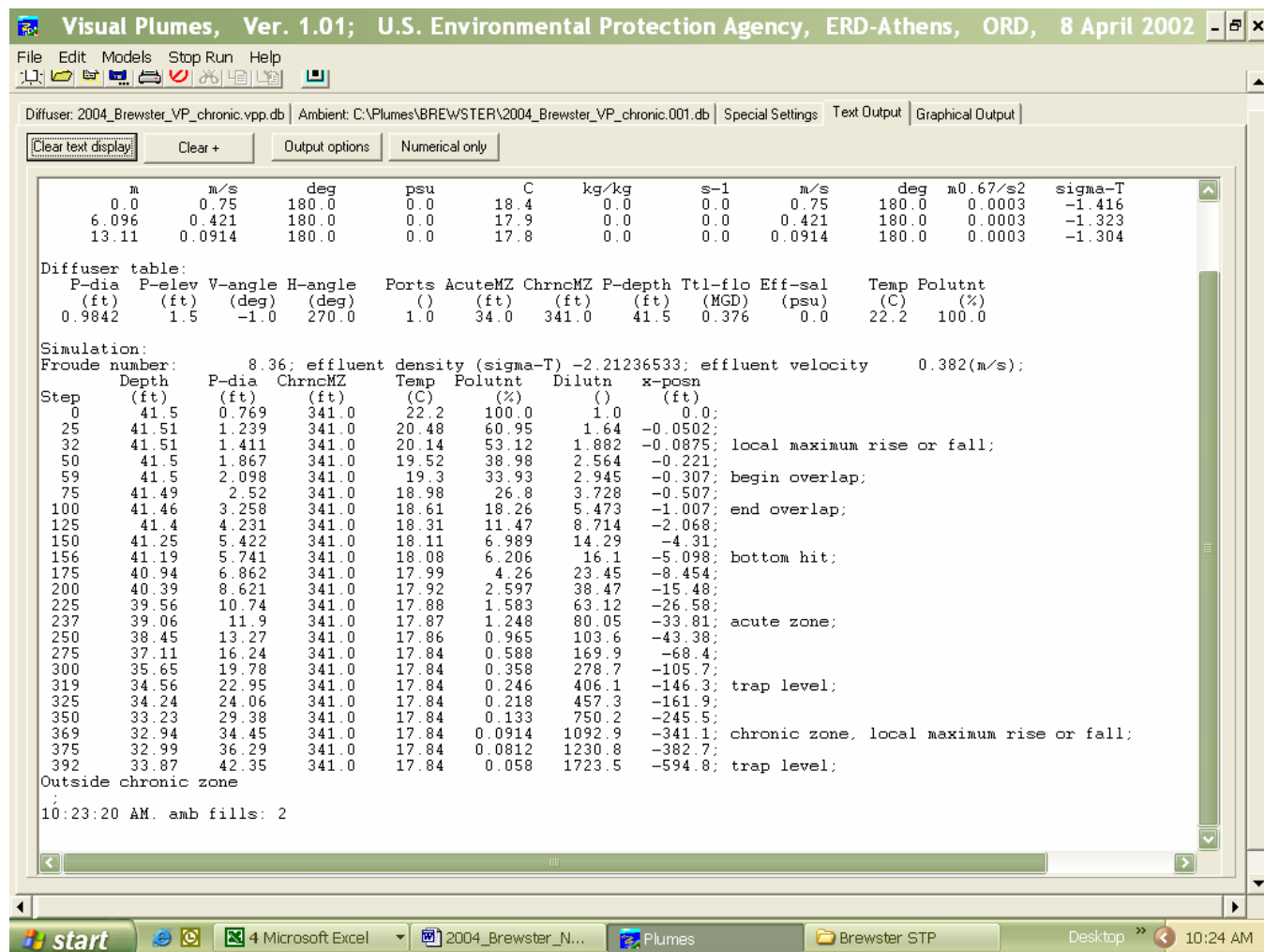
**Upset**--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water Quality-based Effluent Limit**--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

## APPENDIX C -- TECHNICAL CALCULATIONS

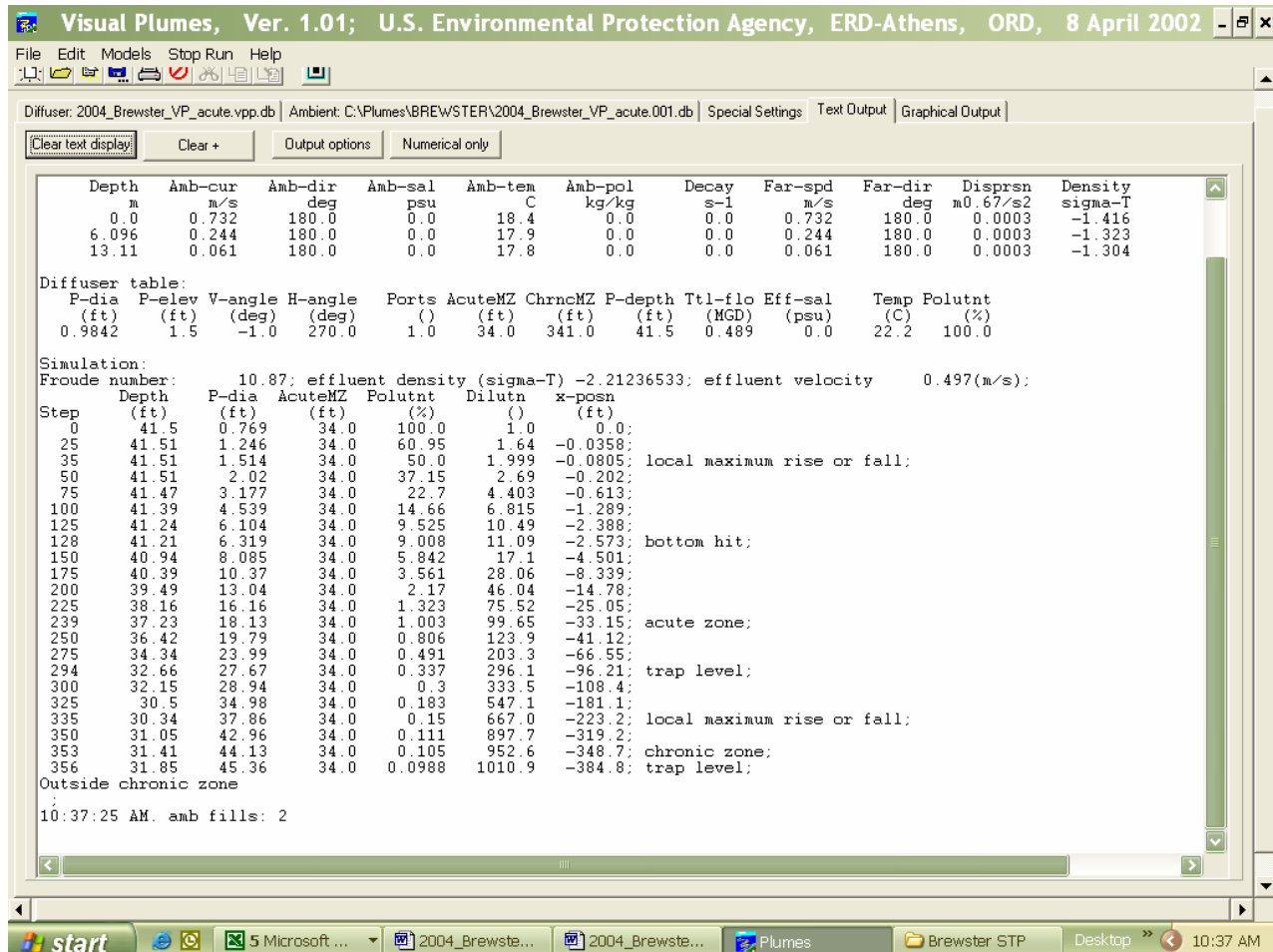
Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

Visual Plumes dilution modeling output dilution factor at edge of chronic mixing zone:



APPENDIX C -- TECHNICAL CALCULATIONS (continued)

Visual Plumes dilution modeling output dilution factor at edge of acute mixing zone:



BREWSTER WASTEWATER TREATMENT  
FACILITY  
EXPIRATION DATE: NOVEMBER 30, 2009

APPENDIX C -- TECHNICAL CALCULATIONS (continued)

AQUATIC LIFE REASONABLE POTENTIAL DETERMINATION FOR BREWSTER STP 2004																	
				State Water Quality Standard		Max concentration at edge of...											
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation	s	# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	Acute	Chronic	ug/L	ug/L	ug/L	ug/L	ug/L			Pn	ug/L	CV		n			
CHLOROFORM				28900	1240	0.58	0.05	NO	0.95	0.368	19.40	0.60	0.55	3	3.00	100	1093
ZINC	0.996	0.996	5.8	77.7	70.9	8.33	6.03	NO	0.95	0.473	100.45	0.60	0.55	4	2.59	100	1093
AMMONIA			100	5445	988	554.04	141.54	NO	0.95	0.473	17600.00	0.60	0.55	4	2.59	100	1093
CHLORINE				19	11	6.24	0.57	NO	0.95	0.996	1100.00	0.60	0.55	780	0.57	100	1093

HUMAN HEATH REASONABLE POTENTIAL FOR BREWSTER STP																	
Revised 3/00		Water Quality Criteria for Protection of Human Health	Max concentration at edge of chronic mixing zone.		Expected Number of Compliance Samples per Month								# of samples from which # in col. K was taken		Calculated 50th percentile Effluent Conc. (When n>10)		
	Ambient Concentration (Geometric Mean)			LIMIT REQ'D?		AVERAGE MONTHLY EFFLUENT LIMIT	MAXIMUM DAILY EFFLUENT LIMIT	Estimated Percentile at 95% Confidence		Max effluent conc. measured	Coeff Variation	S		Multiplier		Dilution Factor	
Parameter	ug/L	ug/L	ug/L			ug/L	ug/L		Pn	ug/L	CV	S	n				
DICHLOROBROMOMETHANE 75274 12V	0.0000	0.27	0.003	NO	0.33	NONE	NONE	0.50	0.05	1.20	0.60	0.6	1	2.49	3.00	1135.0	
CHLOROFORM 67663 11V	0.0000	5.70	0.010	NO	0.33	NONE	NONE	0.50	0.47	10.40	0.60	0.6	4	1.04	10.80	1135.0	

APPENDIX C -- TECHNICAL CALCULATIONS (continued)

CALCULATION OF TEMPERATURE AND FECAL COLIFORM COUNT AT EDGE OF CHRONIC MIXING ZONE  
UTILIZING MASS BALANCE EQUATION

TEMPERATURE AT EDGE OF CHRONIC ZONE				
Effluent flow (mgd)	Effluent Temp. (Degrees Centigrade)	Receiving Water Flow (mgd)	Receiving Water Temp. (mgd)	TEMPERATURE AT EDGE OF CHRONIC MIXING ZONE
0.376	22.2	411	18.4	18.40
				Dilution Factor
				1094

FECAL COLIFORMS AT EDGE OF CHRONIC ZONE				
Effluent flow (mgd)	EFFLUENT MAXIMUM FECAL COLIFORM COUNT	Receiving Water Flow (mgd)	Receiving Water FECAL COLIFORM COUNT	FECAL COLIFORM COUNT AT EDGE OF CHRONIC MIXING ZONE
0.376	2000	411	5	6.82
				Dilution Factor
				1094

Note: Dilution Factor obtained from Visual Plumes UM3 model for chronic mixing zone

**APPENDIX D -- ADDITIONAL ADDITIONAL CHEMICAL ANALYSIS OF  
INFLUENT AND EFFLUENT**

PESTICIDES	VOLATILE COMPOUNDS	ACID COMPOUNDS	BASE/NEUTRAL COMPOUNDS
Aldrin	Acrolein	2-Chlorophenol	Acenaphthene
Alpha-BHC	Methylene Chloride	2,4-Dichlorophenol	Acenaphthylene
Beta-BHC	1,1,2,2-Tetrachloroethane	2,4-Dimethylphenol	Anthracene
Gamma-BHC (Lindane)	Toluene	2 methyl 4,6-dinitrophenol	Benzidine
Delta-BHC	1,2-trans-Dichloroethylene	2,4-Dinitrophenol	Benzo(a)anthracene
Chlordane	1,1,1-Trichloroethane	2-Nitrophenol	Benzo(a)pyrene
4,4'-DDT	1,1,2-Trichloroethane	4-Nitrophenol	3,4-Benzofluoranthene
4,4'-DDE (p,p-DDX)	Trichloroethylene	4 chloro-3-methylphenol	Benzo(ghi)perylene
4,4'-DDD (p,p-TDE)	Trichloroethylene	Pentachlorophenol	Benzo(k)fluoranthene
Diieldrin	Trichlorofluoromethane	Phenol	Bis(2-chloroethoxy) methane
Alpha-endosulfan	Vinyl Chloride	2,4,6-Trichlorophenol	Bis(2-chloroethyl) ether
Beta-endosulfan	Acrylonitrile		Bis(2-Chloroisopropyl) Ether
Endosulfan sulfate	Benzene		Bis(2-Ethylhexyl) Phthalhalate
Endrin	Bis(Chloromethyl) Ether		4-Bromophenyl phenyl ether
Endrin aldehyde	Bromoform		Butyl benzyl Phthalate
Heptachlor	Carbon Tetrachloride		2-Chloronaphthalene
Heptachlor epoxide	Chlorobenzene		4-Chlorophenyl phenyl ether
(BHC-hexachlorocyclohexane)	Chlorodibromomethane		Chrysene
PCB-1242	Chloroethane		Dibenzo (a,h) anthracene
PCB-1254	Chloromethane		1,2-Dichlorobenzene
PCB-1221	2-Chloroethyl vinyl ether		1,3-Dichlorobenzene
PCB-1232	Chloroform		1,4-Dichlorobenzene
PCB-1248	Dichlorobromomethane		3,3'-Dichlorobenzidine
PCB-1260	Dichlorodifluoromethane		Diethyl Phthalate
PCB-1016	1,1-Dichloroethane		Dimethyl Phthalate
Toxaphene	1,1-Dichloroethane		Di-n-Butyl Phthalate
	Dichloroethylene		2,4-Dinitrotoluene
	1,2-Dichloropropane		Di-n-octyl Phthalate
	1,3-Dichloropropylene		1,2-Diphenylhydrazine
	Ethylbenzene		Fluoranthene
	Bromomethane		Fluorene
			Hexachlorobenzene
			Hexachlorobutadiene
			Hexachlorocyclopentadiene
			Hexachloroethane
			Indeno (1,2,3-cd) pyrene

PESTICIDES	VOLATILE COMPOUNDS	ACID COMPOUNDS	BASE/NEUTRAL COMPOUNDS
			Isophorone
			Naphthalene
			Nitrobenzene
			N-nitrosodimethylamine
			N-nitrosodi-n-propylamine
			N-nitrosodiphenylamine
			Phenanthrene
			Pyrene
			1,2,4-Trichlorobenzene

## APPENDIX E -- RESPONSE TO COMMENTS

The City of Brewster submitted the following comments to the Department regarding the City's NPDES Waste Discharge Permit public review draft and fact sheet:

### Fact Sheet Comment #1

Page 6, Paragraph 2. The modifications to the oxidation ditch will meet future organic loads only if both rotors are operational. As a result, the City is currently pursuing funding to add a third rotor to provide additional reliability.

*Department's response:*

*Since the recent upgrade (2003), the oxidation ditch is operating with two new rotors. The Department agrees that a third rotor in the oxidation ditch will provide needed reliability.*

### Fact Sheet Comment #2

Page 6, Paragraph 6. The date for the I/I evaluation (August 1, 2005) does not match the date in the Permit (September 1, 2008). The Fact Sheet and Permit should both read September 1, 2008.

*Department's response:*

*The incorrect date in the fact sheet is acknowledged. The I/I evaluation due date is that given in the Permit (September 1, 2008), not the fact sheet. Ecology's policy prohibits changes to the fact sheet once it has been public-noticed.*

### Fact Sheet Comment #3

Page 7, Paragraph 3. The existing clarifier is proposed to be converted to an "aerated sludge holding tank" versus an "aerobic sludge digester" as stated.

*Department's response:*

*The Department acknowledges that the proposed upgrade will convert the clarifier to an "aerated sludge holding tank". Ecology's policy prohibits changes to the fact sheet once it has been public-noticed.*

Fact Sheet Comment #4

Page 11, Table 4. As presented in Item 1, the plant can meet the maximum influent BOD<sub>5</sub> loading only with both rotors operating.

*Department's response:*

*The Department concurs. Table 4 presents the Year 2020 Design Standards for the City of Brewster WWTP. It is understood that the maximum BOD<sub>5</sub> influent loading can be effectively treated only with both rotors operating. See also response to comment #1.*

Fact Sheet Comment #5

Page 13, Paragraph 2. 418,000 gpd is the average annual design flow rate (2020). The maximum monthly design flow is 610,000 gpd (2020).

*Department's response:*

*The Department agrees with the comment given above. The Permittee has submitted a revised design criterion stating the maximum monthly design flow of 610,000 gpd. Ecology's policy prohibits changes to the fact sheet once it has been public-noticed. Design Criteria in the permit have been corrected to include the maximum monthly design flow of 610,000 gpd.*

NPDES Permit Comment #1

Page 11, Table. BOD<sub>5</sub> and TSS loads are based on annual average daily flows, which should be reflected in the table. Monthly and daily flows and loads may exceed these numbers. As a result, the flow and loading limits should be based on a 365-day running average.

*Department's response:*

*The upgraded treatment plant's flow, influent BOD<sub>5</sub> and TSS design criteria given the public review draft have been revised (Table on page 10 of the permit). The design criteria in the public review draft were annual average daily values. The criteria have been revised to reflect maximum monthly flow, BOD<sub>5</sub> and TSS design criteria.*

*The effluent loading limits given in SI. Discharge Limitations of the public review permit have also been revised. The revised effluent loading limits are also based on the treatment plant's maximum monthly design flow of 610,000 gpd, which is the design flow given in comment #5 above. The new loading limit calculation is given here: Monthly effluent mass loadings for BOD and TSS (lbs/day) were calculated as the maximum monthly design flow (0.610 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = 153 lbs/day. The weekly average effluent mass loading is calculated as 1.5 x monthly loading = 229 lbs/day.*

NPDES Permit Comment #2

Page 11 [*sic- page 12*], Paragraph 5 (S4.E.2). The criteria for conducting an I&I rehabilitation project should be per capita flows exceeding 120 gpd for infiltration and 275 gpd during storm events per US EPA guidelines. Using a 15 percent increase could result in significant expenditures to address a very small amount of flow.

*Department's response:*

*The permit has been revised to strike paragraph two and three in Section S4.E. Paragraph one in Section S4.E has been revised to add the following: "If the evaluation reveals per capita flows exceeding 120 gpd for infiltration and 275 gpd during storm events as per US EPA guidelines, a plan and a schedule for: (1) locating the sources of infiltration and inflow; and (2) correcting the problem shall be prepared. The report shall be submitted by **September 1, 2008.**"*